**Amendments to the Drawings**

The attached sheet of drawings includes changes to FIG. 1. This sheet, which includes FIGS. 1 and 2, replaces the original sheet including FIGS. 1 and 2. In FIG. 1, the labels "DC Voltage Source" and "AC Voltage Source" have been added to blocks 101 and 102, respectively.

Attachment: Replacement sheet

## REMARKS

Claims 1-12 remain in the application. Reconsideration and allowance of claims 1-12 are respectfully requested.

**Objection to the Drawings**

In item 2 on page 2 of the Office Action, the drawings have been objected because blocks 101 and 102 of FIG. 1 lack a descriptive label. By this paper, in FIG. 1, the text label "DC Voltage Source" has been added to block 101 and the text label "AC Voltage Source" has been added to block 102." No new matter is added by this amendment, which finds support in the specification at page 10, lines 7-8 and 20-21. Entry of this amendment is respectfully requested in order to place the application into condition for allowance or to narrow the issues for appeal.

**Rejection of the Claims under 35 USC § 101**

In item 3 on page 3 of the Office Action, claims 1-12 stand rejected under 35 U.S.C. § 101 as being directed to non-patentable subject matter. According to the examiner,

> Claims 8-12 are rejected under 35 U.S.C. 101 because the claimed invention lacks patentable utility. It is noted that a tangible result is not realized in the method claims. Calculating and determining the resistance values in and of themselves are not tangible results. A step is needed to convey the results, i.e., outputting, displaying, storing, etc.

According to the USPTO's *Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility,* Annex V,

> In practical term, claims define nonstatutory processes if they
> - consist solely of mathematical operations without some claimed practical application (i.e., executing a "mathematical algorithm"); or
> - simply manipulate abstract ideas, e.g., a bid ... or a bubble hierarchy ..., without some claimed practical application.

Claim 8 neither recites "solely mathematical operations" nor "simply manipulates abstract ideas." Claim 8 recites a method that generates and detects an electrical parameter that is indicative of an

electromigration within the tested conductive structure. Specifically, claim 8 recites "electrically coupling a conductive structure to be tested to an electrical circuit..., supplying the conductive structure to be tested with a direct-current..., heating the conductive structure to be tested by means of the alternating-current...." Each of these is a concrete and tangible operation, so that the method claim solely recites mathematical operations or manipulates abstract ideas. The recited method therefore is a "practical application that produces a useful, concrete, and tangible result".

It is submitted that the Final Office Action may take a too-narrow interpretation of the requirement of a "concrete" result by requiring a tangible conveyance. Although the electrical parameter that is indicative of an electromigration may be outputted to a device, stored on a physical medium, and/or displayed on a display, reciting such activity is not necessary to render the claimed method sufficiently concrete to satisfy the standards of section 101... Reconsideration of the non-statutory subject matter rejection of claims 8-12 is therefore respectfully requested.

**Prior Art Rejection of the Claims**

In item 5 on page 3 of the Final Office Action, claims 1-5 and 8-12 stand rejected by the Examiner under 35 U.S.C. § 103 as being obvious over *Ohmi* (US 5,291,142). In item 6 on page 6 of the Final Office Action, claim 6 stands rejected by the Examiner under 35 U.S.C. § 103 as being unpatentable over *Ohmi* in view of *Suzuki et al.* (US 6,223,686). In item 7 on page 6 of the Final Office Action, claim 7 has been rejected by the Examiner under 35 U.S.C. § 103 as being unpatentable over *Ohmi* in view of *Schwarz et al.* (US 4,483,629)

The rejections and the Examiner's comments have been considered. Reconsideration of the final rejection of the claims is respectfully requested. Before discussing the prior art in detail, it is believed that a brief review of the subject matter of the claims would be helpful.

Claim 1 (and similarly, claim 8) recites, *inter alia*:

> a circuit having at least one conductive structure to be tested, which is electrically coupled to the DC source and the AC source, the DC source exposes the conductive structure to a DC current in order to cause electromigration in the

> conductive structure, the AC source exposes the conductive structure to an AC current in order to heat the conductive structure to a predetermined temperature, wherein the AC current is ***independent*** of the DC current and is ***superposed*** on the DC current;

(*Emphasis added.*)

In the *Response to Arguments* on pages 7 and 8 of the Final Office Action, it is stated that:

> The applicant argues against the rejection of independent claims 1 and 8 and the deficiencies of the primary reference Ohmi. *"The above-noted passage of Ohmi indicates that the first current and second current are not concurrent. Ohmi therefore does not disclose a concurrent, overlapping AC and DC current. "* (Page 9)
>
> In response, it is noted that the features upon which applicant relies (i.e., concurrent and overlapping) are not recited in the rejected claim(s). . . . In fact, these limitations are not explicitly disclosed in the specification either. If the applicant believes concurrent and overlapping is implied by the newly added limitation of "the AC current is independent of the DC current and is *superposed* on the DC current" (emphasis added), the Ohmi reference still meets the limitation by the disclosure of the second current supply means which ***can*** superimpose on a DC current an AC current (Column 3, lines 50-54). The independence between the DC current and AC current is ***inherently present*** the in the superimposed limitation. Thus, a DC supply, an AC supply, an independent DC current and an independent AC current imposed on it are all explicitly disclosed by Ohmi. (Emphasis added.)

Actually, the limitations discussed in this passage are clearly disclosed in the specification of the present application. Paragraph 0038 of the instant application states:

> [0038] . . . The pulse generator 102 ***superposes*** a symmetrical alternating current ***on*** the direct current, which serves as stress current. . . . the electromigration is scarcely ***influenced*** by the electrical current density effected by the ***alternating current.*** The sole effect of the alternating current is to heat the conductive structure 100 to be tested. . . . If appropriate, the magnitude of the ***alternating current*** is readjusted, thereby ***maintaining*** a constant temperature and thus ***constant stress conditions*** for the electrically conductive structure. . . .

(Emphasis added.)

It is clear from the above passage of the specification that the claim language "wherein the AC current is ***independent*** of the DC current and is ***superposed*** on the DC current" means what it states: that the AC current and DC current coexist concurrently and are overlapping, otherwise it is not possible to superpose an AC current on a DC current.

As discussed in MPEP § 2112, a limitation recited in a claim that is not expressly or implicitly disclosed in a prior art reference is inherently disclosed therein if, and only if, the "missing" limitation is ***necessarily present*** in the prior art, and that it would be so ***recognized by persons of ordinary skill.*** The principles of inherency require that the inherency be ***absolute,*** and not probabilistic. There is no indication in *Ohmi* that it the DC current and AC current are necessarily independent from each other, and that this would be so recognized by persons of ordinary skill.

Furthermore, the first current and second current are ***not*** concurrent in *Ohmi.* *Ohmi* states in col. 4, lines 34-57:

> The method . . . is explained by referring to FIG. 2. FIG. 2 represents resistance change of the interconnector when a first and a second current are ***repeatedly*** applied. A current . . . is applied to the interconnector as a ***first*** current and an initial value of the resistance is obtained . . . . Then, ***the current is gradually increased to a second current*** so that the temperature of the interconnector rises to a prescribed value. . . .
> ...
> After a ***second*** current . . . is applied for a prescribed period, the ***current is dropped instantly to a first current.*** The temperature of the interconnector decreases to that of coolant and therefore the resistance also decreases. The resistance becomes larger than the initial value as a result of electromigration.

(Emphasis added.)

The above-noted passage of Ohmi clearly indicates that the first current and second current are ***not*** concurrent. Ohmi therefore does not disclose an AC current superposed on a DC current, as recited in the claims.

One inventive concept of the invention of the instant application is to use an AC current for the heating and a DC current for the electromigration, wherein the ***AC current*** is ***independent*** of the DC current and is ***superposed*** on the ***DC current.*** *Ohmi* does not disclose (or suggest)

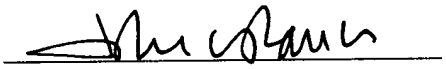
these claim features. Therefore, the invention as recited .in claims 1 and 8 of the instant application is believed not to be obvious over *Ohmi*. Claims 1 and 8 are, therefore, believed to be patentable over the prior art and because the dependent claims are ultimately dependent on either claim 1 or claim 8, they are believed to be patentable as well.

Considering the deficiencies of the primary reference *Ohmi*, it is believed not to be necessary at this stage to address the secondary references, Suzuki *et* al. and Schwarz *et* al., applied in the rejection of dependent claims *6* and 7, and whether or not there is sufficient suggestion or motivation with a reasonable expectation of success for modifying or combining the references as required by MPEP *5* 2143.

In view of the foregoing, reconsideration and allowance of claims 1-12 are solicited.

With this response, the application is believed to be in condition for allowance. Should the examiner deem a telephone conference to be of assistance in advancing the application to allowance, the examiner is invited to call the undersigned attorney at the telephone number below.

Respectfully submitted,



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